

Testimony of the Honorable Robert L. Sumwalt, III
Board Member
National Transportation Safety Board
Before the
Subcommittee on Aviation
Committee on Transportation and Infrastructure
United States House of Representatives

Hearing on the US Airways Flight 1549 Accident
February 24, 2009

Good morning. With your concurrence, Mr. Chairman, I would like to give you a short summary of the Safety Board's activity to date, regarding the investigation of the accident involving US Airways flight 1549.

On January 15, 2009, at 3:27 in the afternoon, US Airways flight 1549, an Airbus A320-214, registered as N106US, experienced multiple birdstrikes following takeoff from New York's LaGuardia Airport. Birds were ingested by both engines and caused a significant loss of thrust. Due to the thrust loss, the airplane was unable to maintain level flight. The flight crew subsequently ditched the airplane in the Hudson River, adjacent to the Intrepid Sea, Air, and Space Museum, in New York City.

The 150 passengers and 5 crewmembers evacuated the aircraft and were rescued by local ferry operators and boaters in the immediate area. One flight attendant and three passengers suffered serious injuries during the touchdown. Examinations of log entries revealed that the ferry *Thomas Jefferson* arrived at the airplane 3 minutes after the ditching occurred, the ferry *Thomas Kean* arrived 2 minutes later, the ferry *Moiria Smith* arrived 1 minute after the *Thomas Kean*, and the ferry *Athena* arrived 1 minute later. The logs indicate that by 4:20 p.m., all passengers and crewmembers were off the airplane.

During and following the evacuation, the aircraft drifted downriver at a speed of about 1.6 miles per hour. During the rescue operations, the airplane was lashed to tugboats and fireboats to keep it afloat. The river current drove the airplane and boats toward the Manhattan shoreline and a tug then pushed the airplane to the Battery Park shore where it was then tied to a pier near the World Financial Center in lower Manhattan, about 3.5 miles from the touchdown point. In the days following the accident, the aircraft, minus the left engine, which had been knocked off during impact with the water, was lifted onto a barge and transported to a docking location on the New Jersey side of the river. There, the wings, horizontal stabilizer, vertical stabilizer, and right engine were removed. The left engine was recovered from the river 3 days later. The engines were transported directly from the dock in New Jersey to the General Electric facility in Cincinnati, Ohio, for investigative teardown. The rest of the wreckage is in a storage yard in Kearny, New Jersey, where it will remain for further study.

Interviews with the flight crew revealed that the initial takeoff was completely normal until the first officer spotted a group of dark birds slightly to the right of the flightpath. In his statements to Safety Board investigators, the captain stated that he saw the birds an instant later and said that the flock “filled his windscreen.” He indicated that he had no time to react before he felt and heard the birds colliding with the airframe. He also described a feeling of an immediate and dramatic loss of thrust at the same time. He stated that he immediately took control of the airplane from the first officer and transmitted a mayday call to the departure air traffic controller. He then described directing the first officer to begin emergency procedures for dual engine failure. Due to the low altitude and the inability to maintain level flight, the captain said he concluded that a ditching in the river was the safest alternative available. He then made a single “brace for impact” call on the public address system, and shortly thereafter touched down in the water. He said that the wings were level at impact and that the airplane stopped suddenly.

The flight recorders were recovered from the aircraft intact and in good working order. The flight data recorder, or FDR, revealed that the elapsed time from takeoff to the birdstrikes was a little over 1.5 minutes. The time from the birdstrikes to touchdown in the water was about 3.5 minutes. The birds struck the aircraft at an altitude of about 2,750 feet.

Interviews with the three flight attendants revealed that the overall evacuation was orderly. In general, they stated that they heard a thud or thuds and then the airplane became very quiet. One noticed that the airplane was descending. When they heard the captain call “brace for impact” they began to shout, “brace, brace, heads down, stay down.” One forward flight attendant described the touchdown as very firm, and the aft flight attendant described the touchdown as violent. None of them realized that the airplane was in the water until they looked out the windows.

Several problems complicated the evacuation effort. Cargo compartment structure had been pushed up through the floor of the rear of the airplane that resulted in an injury to the aft flight attendant. The aft pressure bulkhead of the fuselage was also compromised and water began to enter the rear cabin area. This water caused the fuselage to float tail down, and precluded the use of the two aft slide rafts. In addition, one passenger opened one of the rear doors, and the aft flight attendant could not completely reclose the door during the evacuation.

The FDR revealed no anomalies in the operation of the two General Electric/CFM56 engines during the accident flight up until the time the birds were ingested. The engines were disassembled at the General Electric factory in Cincinnati, Ohio. Canada Goose remains, including feathers, were found in both engines. We could not determine the number of birds ingested. The U.S. Department of Agriculture and the Smithsonian Institution assisted the Safety Board in these matters. Both engines show soft body damage on compressor blades and some of the compressor blades are bent. This bending was due to bird impact or impact with the water. Two days before the accident, one engine experienced a compressor stall in flight. Subsequent maintenance

on that engine before the accident flight included the replacement of a temperature probe in accordance with approved procedures. Maintenance tests following this replacement revealed no anomalies, and investigators have found no evidence to indicate that this earlier compressor stall was related to the accident 2 days later. In addition, an examination of engine maintenance records revealed that the engines on the airplane complied with all FAA airworthiness directives and manufacturer advisory bulletins in effect at the time.

An examination of the structure of the aircraft following the accident revealed severe damage to the underside of the rear fuselage, including the aforementioned compromised aft pressure bulkhead. Further documentation and measurement of the damage will occur soon. An examination of the aircraft systems revealed no anomalies associated with the flight controls. The auxiliary power unit, located in the rear fuselage was hanging from the rear of the airplane by its generator cables. The ram air turbine was found in its extended position. The auxiliary power unit was started by the captain after the thrust loss to supply electrical and hydraulic power, and operated as anticipated. The ram air turbine, designed to deploy automatically upon loss of critical electrical and/or hydraulic components, operated as designed. An examination of the interior of the cabin revealed deployed oxygen masks over 8 rows of seats behind row 14, and windows missing or loose in 6 rows aft of row 19.

Passenger turbine-powered airliner ditchings are quite rare but not unprecedented. For instance, in 1963, a Soviet civilian Tupolev-124 airliner ditched in the Neva River near Leningrad with no injuries or fatalities. In 1970, an Overseas National Airways, Inc. (ONA) DC-9 ditched approximately 30 miles east-northeast of St. Croix, Virgin Islands, with 63 persons on board. Forty of those, including 5 crew members, survived. And in 2002, an Indonesian Boeing 737 ditched in a shallow river near Yogyakarta, Indonesia, causing 13 serious injuries and one fatality. During the Hudson River accident, 4 persons were seriously injured, and of course, no fatalities occurred.

Dual jet engine malfunctions in general and dual engine malfunctions caused by ingestion of birds in particular are extremely rare events. Multiple jet engine failures can occur because of fuel exhaustion, rain ingestion, fuel icing, volcanic ash ingestion, and bird ingestion. Most often, bird ingestion causes no loss of thrust or a partial power loss. Even in the case of US Airways flight 1549, which did lose thrust in the left engine, the right engine did not fail completely. However, the thrust available from that engine was insufficient to allow the airplane to remain airborne.

The Safety Board is currently investigating, or assisting in the investigation, of three accidents where birdstrikes may have occurred. Most recently, a Sikorsky S-76 helicopter was likely struck by a bird and crashed near Morgan City, Louisiana, on January 4, 2009. Both pilots and six of the seven passengers on board were killed in that accident, and one person was critically injured. The Board is assisting the government of Italy in its investigation of a Ryanair Limited B-737-800 that crashed near Ciampino, Italy, on November 10, 2008, with no fatalities or injuries. And last, we are investigating

the loss of a Cessna 500 Citation that struck birds near Oklahoma City, Oklahoma, on March 4, 2008, resulting in 5 fatalities.

Since 1973, the Safety Board has issued 32 recommendations to the FAA and other agencies regarding birdstrikes, bird ingestion by aircraft engines, and bird hazard mitigation. The most recent of these recommendations were issued by the Board in 1999. (See attachment.)

The Safety Board has voted to hold a public hearing on the Hudson River accident. The hearing, which will likely be held in late spring of this year, will include the following topic areas:

1. Turbine engine bird ingestion capability. The GE/CFM56 engines on the Airbus A320 airplanes were certified by the European Joint Airworthiness Authority (JAA) and, subsequently, by the U.S. Federal Aviation Administration (FAA) under a bilateral agreement. The engines were originally certified to withstand the ingestion of seven 1-1/2 pound birds directed at the core of the engine. General Electric actually tested the engine using three 2-1/2 pound birds aimed at the core, which exceeded the requirements at the time. Today's test standard for the CFM56-5 is one 2-1/2 pound bird followed by five 1-1/2 pound birds, with a maximum allowable 25% loss of thrust. The fact that the accident engines exceeded even today's standard and still failed, is of great interest and concern to the Safety Board. On November 16, 2007, the FAA amended this certification standard by raising the weight of the bird to 8 pounds for engines manufactured in the future. In its September 2006 response to the FAA notice of proposed rulemaking (NPRM) that preceded this rule change, the Safety Board commented that the FAA's proposed bird weight was too low. We did not specify a minimum weight, but we did note that the weight should be increased to represent birds as large as the Canada Goose, which can weigh up to 24 pounds, thereby representing a more realistic threat to airplanes.

2. The joint JAA/FAA certification of the Airbus A320 regarding water landings. As noted previously, during the US Airways accident sequence, cargo bay structure was forced up through the cabin floor, seriously injuring a flight attendant. According to 14 CFR Part 25.801, practical design measures must be taken to minimize the probability of this happening. Also, the aft pressure bulkhead of the airplane was breached during impact, allowing water to enter the cabin and causing a tail-low water attitude. This precluded the use of the two aft slide rafts during the evacuation of the cabin. Part 25.801 states that following a ditching, the trim of the airplane should allow passengers the opportunity to use the rafts.

3. The effectiveness of bird mitigation efforts at or near airports. According to Embry-Riddle Aeronautical University statistics, birdstrikes cost the U.S. economy over \$300 million, and have caused loss of life in the past. In 2007, a total of 7,439 birdstrikes were reported to the FAA. This number equates to 1.751 birdstrikes per 10,000 aircraft movements. Natural habitat surrounds many modern airports, and this habitat provides shelter, nesting areas, and feeding areas for wildlife that are not usually present in the

surrounding metropolitan area. Further, because bird flight typically occurs at low altitude, a majority of wildlife strikes occur within the immediate airport environment. The Board is interested in exploring the new technologies that are being developed and fielded to detect large groups of birds in these environments.

4. The current state of training at U.S. airlines regarding a ditching scenario. The highly experienced US Airways flight and cabin crews performed their duties in admirable fashion. The Board will explore the amount and type of training these personnel received and will consider what aspects of their training and experience influenced their decision-making and actions during the emergency. And, I might add that the air traffic controllers involved in the event performed their duties in an admirable manner under trying and busy conditions.

Mr. Chairman, this concludes my testimony, and I will be glad to answer questions at the appropriate time.